Notebook, N-09-01-04

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NEW YORK
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029.4

Edison Laboratory

Book No. 1 Small Record

Experiments upon paper

foundations Cylinder Records

From Jan. 4th 1909 to

Aug 22nd 1910

Jan. 4th 1909

Edison Laboratory.

Began work upon experiments to produce paper composite phono. Record.

Mr E. showed me a sample record which he said was made with Shellac Solution coated paper, wound tubular in the following manner, the end of the Shellac coated paper is fixed to a mandril provided with a winding crank, next to this is a metal roll made hot, mounted in a way to press upon the winding mandril, the coated paper passing bitwen the two, as the coated paper contacts the hot roll the shellac coating becomes soft and sticks fast to the adjoining coated paper around the winding mandril this way a solid paper-Shellac tube is formed of the desired thickness. The blank is now placed into a matrix made

Jan. 4th '09

— made hot by circulating hot water around the matrix, the temperature sufficient to render the shellac plastic, the matrix so charged with a blank is placed onto a rubber expander, which is inflated with hydraulic pressure the blank is then expanded and contacts the record matrix to take its impression, about two minute pressure being sufficient, the pressure is now discharged and the blank contracts sufficient to extract from the mould.

A record upon a straight tube, not provided with bearings to fit upon the taper mandrel of the phono, simply a cylender not provided with means to carry the title of the record. a blank was also shown to me, and the parchment paper used to form the blank.

I inspect the record under the microscope, the surface presented itself rough, ground-glass-like—

[3]

Jan. 4th 07

Mr E. asked me, in my opinion what made that surface ab sought. I told him I thought it was air, confined air, or it was the evaporation of shellac solvent. He gave me order to go ahead and see what I could do to overcome the objections.

Jan. 5th to 9th

Fitted up my room in order to start experiments.

Jan. 11th to 16th

After close examination of the record handed me by Mr E. I concluded that the article in that form could not be commercially practical, particularly because it did not carry its title a blank must be made of such form that one end is reduced to take the impression of the title at the same moulding as the record itself.

11th 07

[5] Completed a drawing for a device to carry Master way Record for Electro-Matrix

Jan. 13th 09

Completed drawing for pair of Rolls to wind tube blank with one end bent inward to take title impression.

Jan. 15th

Completed drawing for Record moulding device to use with steam followed by compressed air.

Jan. 20th

Completed drawing for device to form blank with one end bent inward

Jan. 23rd

After sufficient trials I found the winding of a paper tube with one end turned inward was a failure to preform in a commercial way.

Jan 25th

Investigated solutions of gums & resins made Jan. 13th found the best solvents of those I used to be as follows ——— over

Jan. 25th

Completed drawings for Record Moulding device for use with hydraulic press.

Jan. 25th

Jutalung or Jutalong — Bengole
next best — Amyl Acetate
" " — Bi-Sul. Carbon
Asphaltum — Bengole
Balata — Bengole
" — Bi-Sul. Carbon
Shellac — Wood Alcohol
" — Grain Alcohol
" — Amyl Alcohol

The Amyl alcohol makes a clear solution and precipitates some impurities but it is not useful as a quick drying varnish, it may be good to add into alcohol solution to give the varnish more flexibility.

Alcohol solution of shellac to coat paper for record making is also not promissing, because the absolute drying ~~otb~~ is difficult and when it appears dry it still holds alcohol, which evaporates when heated and causes the blank to stick to the matrix.

Feb. 1st

Completed sketch of a mandril to wind a tissue coated paper upon a strawboard paper foundation.

Feb. 4th

After several combinations of gums and Resins to produce a solution coating material for the paper I found that the simple shellac was the best.

Feb 8th

Completed sketch of a mould for making and Rings to invert into blank for taking the title impression, of shellac coated paper.

Feb 10th

Most all volatile oils when heated with shellac will produce a caoutchouc-like mass that remains elastic a long time, Birch oil is most suitable for that, Fusil oil has about the same action.

Feb 11th

Gilsonite (Utah) becomes liquid at 350° F. and mixes with shellac to form a hard mass, and dry. An excess of Gilsonite makes the mass brittle. the mass cannot stand over the heat more than a fraction of an hour before it thickens, probably carbonizes the shellac. but as the shellac assume a higher temperature than its melting point it becomes harder & tougher.

Feb. 13th

The coated paper tubes made by first varnishing the paper and allowing it to dry then winding the shell on a mandrel by heating the coating of shellac with a hot roll is a difficult operation particularly on account of getting all the air out of between the layers. when the air remains confined between one layer and the next, even little blisters like, such blank does not mould good record surfaces.

Feb 13.

Shel-lac. a red powdered resin obtained from Ceilicium H. Shecl No 4

Dissolves in alcohol and ½ Benzol & ½ alcohol produces nice hard films - but brittle.

Does not melt to a fluid - but only to a thick Plastic mass

Mixed with Shellac it coagulates the latter quickly and produces a mass more brittle than Plain Shellac

Shel-Lac is only a trade name for Accroides Resin

Feb. 15th

found that a mixture of Shellac in the proportions of Shellac 6 parts.
Bitumite ⅔ "
Rosin ⅓ "
Fusel oil ½ "

Makes a mass that remains pliable, for a considerable time.

Feb 17th

A moulding device for expanding the blank by hydraulic pressure made by simply forming the rubber like a tube with turned ends to fit into like space at each ends is not successful, the water finds its way out and reaches the paper of the blank and so destroys its contracting power.

Feb 20th

Black Negrozine soluble in alcohol is a good material to Color shellac black as is Bitumite, but Bitumite requires a very high temperature to melt it - to high to be successful for liquid solutions that may remain as for sufficient times

Feb 23 1907

Completed drawings for Melting-pot and blank winder combined.

March 2nd

Carnaba was mixed with Birch-oil to form a good soft cutting wax of good quality perhaps to make masters. It has considerable contracting quality.

March 16th

Completed detail drawings for Blank winding machine.

March 18

Blanks made by winding varnished paper and inserting a ring into one end for the title. Ring moulded of the same varnished paper, works fairly well. The heat and pressure combines to cement the two together allright. One objection is that the end ring does not contract enough to slip out easy: the matrix would have to be made to suite this method.

March 20 th '09

Mr E. handed me some Napthalene to mix with shellac. after few experiments found the proportion best for good hard quick selling mass. was 1¾ part of shellac to 1 Nap. it produces a yellow mass almost as hard as Shellac Glaze and is very much more fluid when hot.

March 22

Shellac 1¾ part. Napthalene 1 part and little Black Negrosine makes a good looking mass. #O.K.

Mr E. handed me some Stearic Acid and said that it was a very good material to mix with shellac. after trying found that the resulting mass had too much affinity for heat. the mass held in the hand for only a few minutes will soften enough to render it useless for record making.

March 25 th

Completed drawing for paper trimmer.

March 25th 07

Found Terpin Hydrate a good material for mixing with shellac.

Shellac 5 parts
Terpin Hyd. 1 "
little Bilsonite to color black.

March 30th

Made a mixture of Bilsonite—Naphthalene + Stearic acid to render shellac fluid enough. which is very fair.

Utah Bilsonite 1 Part
Naphthalene 1 "
Stearic acid 1 "
Temperature about 375° for 5 hrs.
Nap. evaporates 1½ oz in 12 oz.

March 26th

moulded some records with hand made blanks of melted shellac mass. after One day the records that looked good immediately after moulding turned out blistered and the top of the last layer of paper made its appearance; seems that the coating was not thick enough to overcome the natural alteration of the paper or the setting of it. and wherever a large blister showed up, it indicated that some air was confined between the layers of paper, which was compressed when the record was moulded and afterward distorted or expanded bringing the paper with it.

March 31st

Completed drawing for turning paper blank mandrel for the title end.

April 30th 09

Experimented upon different materials to discover a suitable compound to coat the paper.

Found that shellac ought not to be melted at a higher temperature than 200° F. because it seems to harden quickly at higher temp. if it stands for a considerable time at even 200° F over dry heat, it also hardens, or coagulates or carbonizes. The fat oils or non-drying oils will mix with shellac in small proportions but does not after-wards harden. Waxes does not mix as a rule. Found Montane wax the best but produces a mealy mass.

So far have not discovered anything suitable.

May 4th 07

After several trials at making blanks by coating paper with Hot solutions of Shellac & Naptha colored with Lilsonite I find the method difficult on account of the paper taking uneven coatings of the shellac mixture and the coated paper not winding uneven, being thicker on one side or the other or in the center. All attempts to prevent this trouble was not successful.

May 4th

When a tube is made of paper that contains moisture and afterward Coated with record compound, if the thickness of record compound is not thick enough to over-come the setting of the paper, it goes with the paper. Have made blanks with tissue paper .002" thick and record coating about .001" thick. After the blank was formed it looked good for about 24 hours after that that contraction of the paper made the coated surface irregular. after the record was moulded, same thing resulted.

June 3rd 09

Several samples of paper used and made into blanks and moulded into records showed that a short fibre paper is not possible. the short fibre paper would sometime stretch enough to contact the matrix to take the record impression but did not contract enough to let go the matrix. the long fibre paper such as Bamboo fibre proved to be the best. next to that was the Manila fibre. probably made from Manila—Hemp. paper of such fibre is on the market as Rope Manila paper, so called because the paper manufacturers use the worn out Ropes to make the pulp. Parchment paper has considerable elasticity but a Hot solution of shellac—that is a mixture that contains no liquid solvent which has proven the most successful so far, does not adhear to such paper, it peels off after a time. Aside from that it is so brittle that turning the end of the blank is not so practical as the Rope Manila.

[27]

June 11th '07

A good hard and substantial coating compound is prepared as follows.

Melt Utah Gilsonite	3 parts
pine Rosin	1 "
Naphthalene	4 "
Crude Amyl Alcohol	1 "

After the Gilsonite and Rosin are thoroughly incorporated the temperature may be lowered before adding the Naphthalene + Amyl Alcohol. this will be called "Thinner"

Melt Thinner	2½ Parts.
Shellac	6 parts

Heat only enough to make the mixture suitable for coating. This compound will not stand long heating befor it hardens or coagulates or carbonizes. it should be used up as quick as possible, the addition of fresh Thinner + shellac does not stop the thickning of the previous melted quantity. the newly added quantity seems to not mix with the former. something like putting a raw Egg into water containing one partly boiled.

June 19th 09

Tryed to squirt some tubes with the June 11th compound from a gun especially constructed, the thing was not successful. when the compound was liquid to flow through the die the tube could not be formed as expected, it would hang onto the die, when the compound became harder it was so tenacious that it would not shoot out straight, it would hang to one side or the other of the die, the difficulty is with the nature of the Compound, when liquid enough, it is too sticky when little harder it is to tenacious— Elastic— rubber—like.

June 23rd

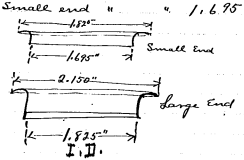
The best way to keep coating material made of naphthalene & shellac, warm is to heat it in a double Kettle using boiling water, in this way the temperature is constant, and the Compound does not coagulate so soon as over dry heating.

The Matrices inside Diameter
is 2.190" at the large end &
2.180 at " Small "
There is some variation in
the I.D. of all matrices

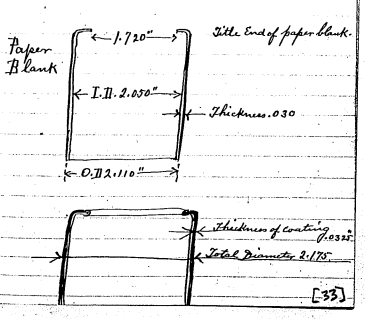
The inside length of the matrices
is 4 3/16"

July 6th

The dimentions of the entching end
of the record should be 1.825"
The Small end " " 1.695"



Metal .012" thick Brass.



July 16th

The Inside tube is made of cheap straw-board wound spiral upon a mandril 1.858" Diameter.
The thickness of the paper averages .023" thick.
The finished tube dimentions should be 4⅞" long (When Dry) &
O. D. 2.063"
I. D. 1.852"
when they are fresh and contain the moisture from the glue they are larger by a few thousandth.

There should be 4 plys of .023" stock and the inner ply of .010" stock

July 19th

Tryed to mould records by inserting the inner tube into the Coated blank and expanding both into the matrix in every attempt the inner tube bursted open! due to the non-elastic quality of the Straw-board.
The right kind of paper might answer alright.

July 26th

Completed drawings for a steam-heated melting pot provided with device to carry paper blank into the melted compound and on drawing out same a stripper is so arranged that it strips off the surplus coating thereby sizing the outside of the coated blank.

July 30th

Made several experiments with shellac such as dissolving it in liquid solvents and then precipitating it in order to extract the impurities, the shellac so purified will thicken or coagulate just as readily as before treating it such.

Have precipitated it from solution in alcohol with diluted Sulphuric acid about 10% acid. +

from Amyl alcohol (Fusil oil) +

" Ammonia solution +

Borax "

Aug 11th

Mr E. handed me some Chloro-Napthalene to use with 3 parts of shellac. Made some samples which proved to mix with more difficulty than the simple Napthalene and the resulting mass would become soft at lower temperature than the simple Napthalene mass. The proportions of Chloro-Napth. to shellac are 1 Chloro- to 2½ shellac up to 1 " to 4 "

The introduction of chloro-napth. does not cure the trouble of frosting or greasing when melted. Chloro-Napth requires a higher melting point than Napth not less than 230°F. the simple Napth will mix well with shellac over boiling water and that is an advantage on account of the thickning of the mixture. Chloro-Napth with the addition of simple Napthalene mixed with shellac will assist to make a more perfect mixture but the resulting mixture does not harden as quick as either one or the other seperately, it it also soften at lower temp. after the finished mass is exposed.

Aug 13th

Moulded some records with # O.K. coated blanks, the coating being .030" thick and the paper blank also .030" thick and spiral wound.

also Moulded some blanks coated with .015" coating, the thicker the coating the better was the resulting records and they stood bitter the contracting power of the paper.

Aug. 16th

Dipped some O.K. coated blanks into Alkali solution of shellac, after drying about 15 hours moulded the records did not contract out of the matrix, examined them 4 days later and were then fast to the matrix.

Aug. 19th

Ordered 1 Roll # 61L V.E. paper from O. B. Hastings; up to now this particular paper has shown better qualities for record making than all others experimented upon, it does not contain much water and what is there seems to evaporate quicker when heated than other papers it has a structure that allows stretching and contracting, it has good affinity for the coating material and is more permanent when in record shape than other papers tryed up to date.

Aug. 20th

The coated blank should be as perfect as possible on the surface, if there are hollow spots or even small pin-holes like the moulded record from such blank is imperfect, where the hollow spots were the record is moulded - but the hollow remains due no doubt to the air confined in the hollow while pressure applied, and in case of the tiny pin holes, they mostly disappear to view but the reproducer finds them all.

Aug. 21st

Pine Rosin and shellac in any proportion will mix, the least quantity of Rosin the better because it destroys the thoroughness of the shellac, renders it more brittle also more stickey to the hand leaving impression of the fingers

Aug 23rd

In the making of the paper tubes by rolling one layer over the other it is necessary to use a glue that has some elasticity and of great adherence for when the tube is expanded in the matrix if the glue is not through the layers of paper will loosen and the resulting blank or record will have no stability, will distort out of true form. if the tube could be made up of one solid piece, that is like a metal tube, it would be the ideal thing

Aug 24th

Chloro-Naph.	2 Part	This compound makes a very good through coating but must be heated at least 250° F to make it fluid enough. and has the same disadvantage of coagulating in about 1 hour. so mixing it useless.
asphaltum to color	1 "	
Shellac	6 parts	

Aug 30th

Manila Gum Elemi. mix well with shellac at 240° in all proportions, gives a clear mass, more brittle than Shellac Elimi heated for a short time evaporates its natural solvents and assumes a rosin like mass, but not so sticky as pine rosin.

A brilliant mass, hard enough, not sticky, is produced as follows

Lamson's #1 Asphalt	1 Part melt + add
Elimi	1 " " + "
Terp-Hydrate	1 " " + "
Shel-	5 " Raise Tem. 300°F.

Sept 6th

A cristal of a melting point same as Shellac that is not volatile would be the most appropriate material, for when the temperature is raised above 220°F. the shellac seems to undergo a change that is, it will coagulate or otherwise it assumes a rubber-like mass, and this appears to take effect with nearly everything that will melt with it.

Sept 10th

Elimi mixes with waxes to harden them, also with asphaltum to reduce its melting point.

Sept 13th

Made a Compound of Viscose with Zinc-Oxide & wood Pulp, squirted a tube about 14" long. left to dry over night. Next morning it had Contracted across the Dia. ___ was very tough. gave it to Grumbaf for further treatment.

Made also a mixture of Viscose with Zinc Oxide and Dried over night. This mixture presented a much finer structure & harder than the sample containing the wood pulp. Dr. Croke says that the zinc oxide combines with the Soda in the Viscose to form Sodium Sulphate.

Sept 14th

Mixed Viscose with mixing Rolls for about 1 hour the Viscose assumed a more elastic quality. left to dry in that condition

Sept 18

None of the Viscose Samples have been found suitable for working into records, particularly on account of the great shrinkage after the decomposing treatment and drying and the further reason that it cannot be made plastic again.

Sept 24th

#'616 V.E. paper is .003 thick, should be wound upon a mandril 2.070" Dia and make 14½ turns. the extra half turn is particularly to offset the overlap of the paper sheet on the opposite side.

Sept 29

Have found that Gum Arabic dissolved in cold water to a consistancy of glycerine is excellent for properly cementing the paper tube. it works well cold and dries quick enough to be practical.

Oct 8th

Made Mixture of Map. 1 lbs.
Rosin 1 oz
Shel 1/2 lbs

Melt Map. with Rosin, Raise temp. to 250°F. then add shellac gradually until all dissolved filter & lower temperature to 230°F. for coating. Seems to give a more homogeneous mass than when more shellac is added. also does not alter on the records surface after standing a while.

Oct. 14th

The Method of dipping the paper blank endwise into the coating compound is troublesome due to the flowing of the compound before it is set. the result is a blank surface that is larger in Dia. in some spots than it is in others. in reality the blank should be on the surface in straight line or it would be better if the center was a shade higher

Oct. 20th

Moulded some very fair Records with the Oct 8th Mixture, the greatest trouble experienced in this lot was the getting out of all the air from between the Matrix & the blank - due to the unevenness of the blank surface.

Nov. 32d

The method of Rolling the paper blank into the Compound and immediately scraping off the excess is so far the best Method employed, not only it produces the most evenly coated blank but it is more quickly done, specially when the turning of the blank is done by power.

Nov 11th

In winding paper, to form a tube it is essential that a elastic body should press the sheet as it enters the roll or tube for the purpose of squizing out excess of glue and air bubbles that might lodge between the layers, a Roller was tried 3 times on diffrent devices and each time was a failure, for the reason that it allowes some excess glue to lay between the layers and of course some air also, which does not show on the Moment, but the next day when the tube is dry, the blisters are very prominent.

Nov 15th

After the paper tube is wound it is rolled upon a hot plate, (Steam heated) about 10 minutes. That dries the outer layers and sets it throughout enought to allow driving it out from its mandrel which cannot be a closepeable one. After the tube is free it is stood on end upon the steam table to completely dry that end, so that the pressure necessary to turn the title end will not alter the proper dimentions of the opposit end. The mandrel or holder used to turn the title end must be about .008" smaller because there is a shrinkage of the tube immediately after extracting from its winding mandrel. After the tube is turn on the title end it is put to dry in the open for about 24 hours then it is placed into a oven of a temperature 190°F for 1 hour. that expelles enough moisture to work well. When upon taking the tube from the oven it is immediately dipped into Alkie solution of shellac and allowed to stand in

the open for at least 4 hours, then it is placed again in the oven 190° F. to expell the alcohol and harden the shellac. Any time after that the tubs may be coated with the record compound.

Nov 23

Made a lot of records with Oct 8th Compound. with tubs having 15½ layers of paper. most of the records showed som air spots. due to the coating being little too thin. it would be possible to mould perfect records with such thin coating if all matrices were straight, but have found that there is a variation of as much as .006". so that with just a little thicker coating it flows more.

Dec. 1st

The Rubber expander must be enough smaller then the inside Dia. of the tube to lean the tube intirely after the record is moulded. the Dia. of the Rubber should be at least 2 inches and so fixed at both ends that there is no water escape.

Dec. 4th

Made a compound of Nap 9 g. ciresin 9 g. & Oct 8th Mixture 14 Lbs. Moulded a few Records. This mixture moulds better, it flows easier, but it is too brittle and coarse, the record surface being very scratchy.

Dec. 9th

Tried to make tubes by drawing the sheet of paper over and under 2 tubes provided with slit openings for allowing the glue to exude from for coating the paper sheet on both sides. So long as the sheet is continuely drawn this method apears to be ok, but the moment the tention is off the sheet, the glue then flows its way out and drips over the device.

Dec. 14th

The Coating of tubes by dipping it into the Comp. and afterward rolling upon a smooth table or Rolls is not suscepfull, the trouble lies in the Comp. not plastic enough, the coating is so thin that cristalization begins almost immediatly and when in that condition it cannot be displaced to form it without pulling it away from the paper.

Dec. 17th

This paper Record with Oct 8th Comps. Coating if reinforced with a stiff inner tube and subjected to a temperature as low as 10° above 0 will expand enough to crack, that is, the inner tube reinforcement will expand while the coating probably has a tendency to contract, at any rate it becomes more brittle. The Cracking of the record surface is certainly due to the unevenness of expansions & contractions of the paper & coating. But when the Record is provided with only about 1 inch long inner tube reinforcement and subjected to the same low temp. the Record surface remain unaltered.

Dec. 18th

Tried to make End Ring with .012" Tin, when the Blank is made and afterward annealed, then it draws as well as Brass, but will crack open if not annealed.

Dec. 23rd

Made a lot of Records of tubes made of #616 V.E paper sized with Gum Arabic, This Gum Arabic binds the paper more compact than other Gums of approximately the same Cost. Some more trouble was experienced in getting out all the air from between the Matrix and blank. upon investigation of the Matrices found that it was not straight bore. This defect cause the blank to close in first on the high spots and so imprison the air.

Dec 30th

Made some blank tubes with Resine as a size, the result was not favorable. this size will not bind the layers of paper enough to stand collapsing, when a tube is not compact enough to stand binding in without the layers of paper letting loose such blank tube will not should a good permanent record. further more it is very liable to split open in expanding it.

Dec. 31st

Mr Edison ordered me to go ahead with designs to make the Record on commercial scale, said that Mr Stoufel was hereafter Chief Engineer of the Laboratory and any thing required to be laid out on the drawing-board he would do as soon as I would give him sketches of what was required to be developed.

Jan 7th

Mr Ardron called to investigate the record saying he wished to take some with him for the purpose of experimenting upon new Reproducers to suit the Hard-surface Record with object to obtain louder tone.

Jan 7th

Mr Dyer called to look over my records and investigate the process of making. I complained to him that quicker actions would result if I could have my devices made in less time. having only one man to do it all is not enough.
He remarked that the Result of my showing was very encouraging.

January 1910

Jan 8th

Have completed plans for a new Record moulding device having for improvement an Expander of Rubber closed at one end, this does away with the Taper wedge which was liable to be misused in mfg. on a large scale.

Jan. 9th

Completed plans for new tube winding machine which provides for power winding, gluing & cutting of the paper.

Jan 10th

Completed plans for a mould to make the new Rubber Expander which is open only at one end.

Jan 11th

Mr Spitkel starts on making the new moulding device for Records.

Jan 12th '10

Investigated the process of making the matrices with object to overcome the bulging out of the Sub-Master which is the Bug in commercial-Record matrices.

Mr Atkin who appears to have considerable to say in this matter tells me that the very thing I want to overcome was gone over by Mr Kelsey Mr Mear and Mr. Elsworth and himself, with results that the matrices as now produced are absolutly as straigh as possible to make them.

Jan 15th

Tested the strength of the paper Blank tube by expanding with Record moulding device. A tube wound of #616 V.E. Paper 14½ layers and dried will burst when a pressure has reached 3500 lbs to □"

The tubes will expand .030" before bursting

Jan. 31st, 10

Have been ill for two weeks
Just returned to start in again.

Mr Edison gave me some Chloro-Naph.
to use for making coating material
with instruction to use 1 to 2 parts of
it to 1 part of Shellac. and that
lamp black may be incorporated if
ground into the Chloro-Naph before
mixing with shellac.

Feb. 2nd

Completed News Record Moulding device
the important feature of which is an expander
with only one end open. thus reducing
the leakage possibility. in the old device
the Center spindle projected up through
the Expander. the spindle being of
metal was liable to destroy the matrices
when they were inserted. this new
device eliminates that altogether.
Further more there are no loose parts
like wedges + hammer to look out
for.

Feb. 3rd-10

Delivered to Mr Shoepel Sketches of the Inner tube with instruction to make a device for making them in a commercial way.

Feb. 3rd

Del. to Mr Sh. Sketch of Large-End Metal Ring with model. with instruction to make dies for manufacturing.

Feb. 3rd

Del. to Mr Sh Sketch of the Small-End Metal Ring (no model) with inst. to make dies for Manuf.

Feb. 4th

Mr Dyer & Mr Wilson called to inspect my work. demonstrated the tube winding by power which is in progress of construction, and the new moulding device. played some records. they both expressed feeling of satisfaction.

Feb 7th

Received 12 Rolls #616 V.E. Paper 4 9/16" wide cost 11¢ per lb. 4 percent extra for Cutting

Feb 12 - 10

Completed a coating device for the paper blank

Feb 18 - 10

The device which is a small container 4 inches long by 1" Deep x 1 wide provided with a slot near the bottom on one side having a valve on the inside to shut off the supply when the record blank is coated, the trouble with this is that it leaves a streak of coating material just adjacent to the valve, thus making impractical in that condition, but it may be possible to improve it to overcome the difficulty.

Feb. 18 - 10

Sent a letter to Mr. Edison in Florida explaining the trouble of coating material.

Feb. 22. 10

Designed three device for coating which is an improvement of the one described above.

March. 1st '10

Made experiments of mixtures with Chloro-Toliol that Lancaster handed me. Have found that this fat is bitter in every way then any thing used up to now. The proportions are 7 parts of Chloro-~~Cresol~~ Toliol to 12 parts of shellac. and colored with 1/2 part of fat aniline.

3 – 2 – 10

Made mixture of Anilene 1 Part + Stearic acid 1 part heated for 15 hours to boiling temp. the result was a dark brown + flaky mass. which mixed very well with shellac but when a sufficient quantity was added to render the shellac fluid enough. the result was too soft for good record.

3 – 3 – 10

Tried Salicilic acid with shellac. the melting point of the acid was too high to obtain any kind of desirable results.

Tried Salicilic acid with Chloro-Naptha it make a good looking mass but does not harden quick enough.

(77)

3-4-10

Pitch with shellac renders it too sticky for use.

3-9-10

Tried Chloro-Toluol 1 part
Tert Amilene 3/8 "
Soda Carbonate 1/8 "
Shellac 1 1/4 "

The addition of the so-Carb. causes the mixture to remain soft.

Chloro-Naphth 1/2 part
solvent-Naphtha 1/8 "
Shellac 1 "

The solvent Naphtha when heated is so volatile that this would not do to mix in the open.

3-12-10

Tried Chloro-Naphth & Paraldehyde with shellac, the paraldehyde does not improve the mixture as it forms bubbles, or gas.

Tryed Plain Glycerine with shellac at high temp. the two seems to combine and when cool the shellac is rendered more brittle, yet plastic.

3-14-10

Tried Accanilide with Chloro-Naphthal and Chloro-Toluol and shellac, at a temp of 240° F. there is no bubbles and the mixture looks good.

3-17-10

Accanilide 1 Part
Shellac — 1 Part
mixes well. Result too soft, and remains that way for long time.

Chloro-Naphthal — 1 Part
" Toluol — 1 "
Accanilide 1/2 "
#26 Aniline Black 1/32 "
Call this Solvent #1

Solvent #1 1/2 part
Shellac — 1 1/2 part
added more Solvent #1 to render fluid enough. result too soft.

3-21-10

Tried Accanilide with Resorcellon N.G.

3-23-10

Tried Plain Napthalene with accanilide & shellac. Result-not good,

Accanilide with Rosin, not good.

3-30-10

Tried to Combine Chloro-Napthal. with Chloro-Toluol by boiling half & half in a flask for 10 hours there seems to be no change except that the two are simply mixed, but separate crystals, or flakes.

Chloro-Toluol 1 Part
Accanilide 1/32 "
Shellac - 5 parts
Result- looks good, try again

Chloro-Toluol 1 Part
Shellac 1 "
Result - Toluol much in excess when cold. the Toluol comes out. The best proportion is one part Toluol to two & ½ of shellac.

3-31-10

When Coloring the Mixtures of shellac with Chlorinated Naphthalene or Solvol the Alcohol soluble Aniline makes a harder & more brittle mass than when the Fat Aniline is used, the fat-aniline also retards the hardning of the mass and seems to alter the record surface, after a time, perhaps if the coated blank is allowed to stand and harden well before moulding a record, it may not alter. try again.

Tried again to Combine Chloro-Naph & Solvol by boiling up to 500° F. Cant do it.

Chloro-Naphthol 1 Part
Chloro-Solvol 1 Part
Accaniline 16 "
Shellac 3 Part
Makes Good looking mass, but must be worked quick for it sets thicken when heated to 260°.

4-1-10

Fried Glycerine 1/8
Salicilic acid 1/2
Shellac - 1/2
The mixture must come to boiling before thin enough. H.G.

Salicilic Acid with Rosin produces a sticky mass.

4-4-10

China Wood Oil will not mix with shellac.
C.W. Ol. will gelatonyize when heated at low temp for a long time or quickly at high temp.

C.W. Ol. upon paper and heated in oven temp about 220° F. for about 1 hour will form a soft glassy coating. When allowed to stand in the open the paper will absorb it.

The addition of Gum Sandarac to shellac mixtures is no improvment. in fact it renders it more brittle and subject to forming bubbles

4 - 8 - 10

Chloro - Napthal 2 Parts
" Iodine - 8 "
Lamp black 1/64"
Celonite 1/16 "
The lamp black remains in the filter. does not improve the mass.

Chloro - Napthal & Lamp black in proportion to form a plastic mass makes a fine soft impression wax.

4 - 5 - 10

Tried Phatalic Acid with shellac. it is too Volatile when heated.

Tried Resorsin with shellac Resorsin is of too high melting point. Resorsin has the quality of rendering the lac brittle. may be good to add to those mixtures that have a tendency to not harden try again.

Resorsin to costly

4-8-10

Tried Chloral Hydrate, this is too Volatile and the odor is not pleasant and is no improvement over other solvents

4-11-10

Chlor Napthal	2 parts
" Toluol	3 "
Gilsonite	1/16 "
#76 Aniline Black	1/64 "

This is called Solvent #4

Solvent #4	1 Part
Shellac	1/2 "

fair compound.

4-15-10

Naphthalene	1/2 lb
Shellac	13 oz.

Good. but exudes a white frost-like substance, probably naphth.

Naphthalene	1 Part
Rosin	1/16 "
Shel.	1 1/2 "

little less exudation of frost like, Sol.

4-19-10

Highest Distilled Chloro-Toluol 1 Part
Shel - 2 "

This is N. G. the boiling point of the Toluol is too high, it decomposes the shellac.

Chloro Toluol 4 oz
Fat Aniline black 3/16 oz
Shel - 7 oz
Temp. 240° to 260°

4-19-10 #1

Reamed rough paper cut 4 3/16" wide.

Chloro-Toluol 4 oz
#26 Aniline Black 1/16 oz
Shel - 7 oz
Temp 240° to 260°

4-19-10 #2

This does not work as smoothly as the #1

4-20-10-#16

Chloro-Naphthalene 1 Part 6 oz
Fat Aniline Black 3/16 oz
Shellac 1½ " 9 oz
Temp. 260° to 268°

Good but Coagulates in 5 Minutes

4-22-10-

Received from Machine shop the new Blank Coating device. this is a steam Jacketed box-like melting & pattering & Coating arrangement, delivering the drop from near the bottom, through a slot, on the outside there is fixed a straight edge and a movable one so arranged that when the blank is fully coated the movable straight-edge or knife cuts off the delivery. The blank is revolved by power directly adjacent to the slot or opening through one side adjacent to the straight Edges.

4-22-10

Delivered to Mr Dyer 4-½ records
No 1 made April 18th Dope # 18
" " " 19th " " # 12
Two " " 20th " " # 15

4-25-10

Chloro-Toluol — 4 Parts.
Naphthalene 1 "
Resin 1 "
Shel 2 "
Too Soft. Plastic

4-26-10

Chlorinated Turpentine 1/4 oz
Shellac 1/8 oz
Condenses quicker than most other Chlorinated stuff.

Gum Elemi (Soft Mastic) 1/4 oz
Chloro-Lolmol 1/4 "
Locus gum 1/8 "

Chlorinated glycerine 1/4 oz
Shellac 1/4 "
Fat Black Aniline 1/16 "

Turpentine 1/4 oz
Fat Black Aniline 1/32 oz
Shellac 3/4 oz
Added Turpentine 1/8 "

Resorcine 1 Part
C. camphor 1/16 "
Turpentine 1 "
Shellac

N. G.

4-26-'10

Naphthalene	½ oz.
Acanilide	1/32 "
Shellac	7/8 "
Black Fat Aniline	1/16 "

Exudation of white frost on stuff.

Acecanilide	1/16 "
Naphthalene	½ "
Rosin	1/8 "
Black Fat Anilide	1/16 "
Shellac	1 oz

Looks good when in molten state,
Requires a couple times to harden.
Result, too soft

Chloro-Naphtha —	½ oz
Acecanilide	1/32 "
Black Fat Anilene	1/32 "
Rosin	1/16 "
Shellac	3/4 "

Chloro-~~Naphthol~~ —	½ oz
Fat Anilene	3/16 "
Acanilide	1/8 "
Shellac	7/8

Fair

4-28-10

Chlors-Naphtha.	4 oz	
Accanilide	¼ oz	
Rosin	½ "	#9
Shellac	8 oz	

20% Ethereal impurities

This is the best dope made up to date. Brilliancy, Hard 9 months.

5-2-10

Chlors-Toluol	4 oz	
Rosin	½ "	#1
Accanilide	¼ oz	
Shellac	8 oz	

There was exudation of white frost to the Toluol. seems to not be proper.

Chlors-Toluol	½ oz	
Rosin	1/8 "	
Accanilid	1/32 "	#7
Shellac	1 oz	

less Exudation of white frost.

Chlors-Toluol	½ oz	
Rosin	1/8 "	
Accanilid	1/16	
Shellac	1 oz	

Too Elastic.

5-6-10

Chloro-Naphthe.	4 oz	
Accanilid	¼ oz	
Rosin	½ oz	#1
Shellac	7 oz	

Made 14 Blanks. Dope looks good but spirals on bottom. 4-10-22 #9

Chloro-Nap-	4 oz	
Accanilid	¼ oz	#2
Rosin	½ oz	
Shellac	6½ oz	

Temp. 300° F. & reduced to 260°. Made 14 blanks. All fair but Dope dont appear hard enough.

The trouble now is in coating the blank perfect. When the blank surface is not even - if it contains some pin holes - or gas bubbles below the surface, the resulting record may show up good immediately after coming from the matrix, but after a time the gases that were into the coating were naturaly Compressed when moulding the record. And it also expands again forming tiny blisters. The gases over

are generated when the compound is in moulten condition. Close observation as shown that shellac is the material that forms the gases. When shellac alone is melted it is free from gases at first, but very soon bubbles are formed which go on increasing until the shellac has evaporated all the Volatile matter, then the remaining quantity is like a spongy mass and cannot be forced again. The Chloro-Nap acts as a liquefier, it does not form gas not even at evaporating temperature and when shellac is added in proportion to make a desirable mass the shellac predominates and will condense in time the addition of Accanilide is a help to the Chloro-Nap. to better combine with the shellac. the Rosin is also there to render the combination more fluid so that it can be filtered through a 160 screen. When the paper tube revolves before the molten mass it is not as hot as the molten mass and it seems that simply the heat of the molten mass draws gases from the paper tube or the difference of temperature produces the bubbling, which is the stumbling block.

5-9-10

Chloro-Nap-	4 oz	
Accanilid	7/16 "	#1
Rosin	1/2 "	
Shellac	6 "	

Made Blanks at 240°-250° & 260° at 250° it works best at 240° it is little too thick. at 260° it is too fluid.

5-10-10

Chloro-Nap-	4 oz	
Accanilid	3/8 "	#1
Rosin	3/4 "	
Shellac	7 oz	

Made Blanks at 240°-250-&260° Mass little harder than above formula due to more Accanilide & more shellac. filtered through 160 screen at 260°F.

5-10-10

Chloro-Nap-	1/4 oz
Rosin	1/32 "
Acanilid	1/64 "
Shellac	1/2 "
Arrow Root	1/8 "

Makes very smooth to the touch, little too thick to work well. try again

8-13-10

Chloro-Nap- 4 oz "
Rosin 1/2 oz "
Accanilide 5/16 " #1
Shellac 5 1/2 "
Arrow-Root 4 oz "
Made blanks. & pressed Record, was too gritty, but there was no gases or bubbles - Try again

---

Chloro-Nap- 1/4 oz "
Rosin 1/32 "
Accanilide 1/64 "
Shell - 1/2 "
Talk 1/4 oz
Was Gritty

5-16-10

Chloro-Nap- 4 oz
Rosin 1/2 "
Accanilide 1/4 "
Shellac 6 1/2 "
Made Blanks. Fair

Chloro-Nap- 4 oz 5-17-10
Rosin 1/2 "
Accanilide 1/4 "
Shellac 6 1/2 -
Made blanks at 240° and up to 300°
The tone is not permanent, fades after 10 hrs;

5-18-10

Chlorn-Naph — 6 oz
Rosin — 3/4 "
Rosinbisic — 3/8 "
Shellac — 10 "

Looks good

5-19-10

Rosin — 1/2 oz
Yellow wax — 1/4 oz
No 2.

Rosin — 1/4 oz
Scraps — 1/4 " Filler # 2
China Clay — 1/4 "

Chlorn-Naph — 3/8 oz
Locus gum — 1/4 " Filler # 3
Fil Clay — 3/8 "

Rosin — 1/2
China Clay — 1/4
Shellac — 1/8 "
Rosinbisic — 1/64 "
Chlorn-Naphtha — 1/8 "

[redacted] at 400°
Filler # 4

6-20-10

Chloro-Nap- 4 oz
Accanilide 1/8 "
Sandaracgum 3 "
Rosin 1/2 "
China Clay 3 "
Talk 2 "

Filler #5

Coated some blanks, was very full of air bubbles, due to it being too thick. Try Again. Dope is good for first coating.

Chloro-Nap- 3/8 oz
Shellac 1/8 "
Heated to 500° F.
Cool two soft added 1/8 more of shellac and Raised temp to 530°. Coagulated.

Chloro-Nap- 1/2 oz
Shel - 1/4
Gum Sandarac 1/8
Rosin 1/16
Raised temp to 510°
added Accanilide 1/16

Naphthalene 4 oz
Shellac 4 "
China Clay 2 "

Filler #6

Heated to 270° F filtered
Coated blanks, looks good.

5-21-10

Chloro-Nap-	6 oz	
Rosin	1/2 "	
Ac. Anilide	3/8 "	#1
Shel -	.8 "	

Naphthalene	4 oz	
Shellac	4 oz	
Chloro-Nap —	6 oz	
Rosin	1/2 "	#1
Ac Anilide	3/8 "	
Shel —	10 g	

6-23-10

Chloro-Nap-	6 parts	3/8 oz
Elemi Gum	2 "	1/8
Accanilide	1 "	1/16
Shel	10 "	5/8 oz

Too soft, Put on Steam table for 1.30 hrs. and was fluid enough to coat blanks

Try Again

Magnesium Sterate
Chloro-Nap —
Shellac —
Accanilide
Magnesium Sterate
Shellac

6-23-10

Chloro-Nap 1/4
Aluminum Chloride 1/4
Shellac — 1/4

Chloro-Nap- 3/4 oz
Magnesium stearate 1/4 "

Chloro-Nap- 3/8 oz
Magnesium Stearate 1/8 "
" Shellac 3/8 "

June 1st

Chloro-Nap 1/4 oz
Rosin 3/16 "
Acanilide 3/32 "
Shellac 2 1/2 "

Chloro-Nap 1/4 oz
Manosa lime 1/32
Acanilide 1/64
Don't combine

Chloro-Nap- 1/4 oz June 2nd
Phosphate of lime 1/32
Don't combine

Chloro-Nap- 1/4
Resinated Alumina 1/8
Shellac 1/8
Coagulated at once. Temp. 400° F.

[117]

6-3-10

Found it possible to strip the coating from paper tubes by heating the coating over a flame to the melting point then revolve against a Knife edge, this will be advantageous in using over & over again blanks that have been improperly coated or moulded.

6-3-10

Moulded 14 records, every one good, found that the blank must not be heated so much as to make it stick to warm matrices, it should be heated only sufficient to be slightly plastic, about the same as celluloid when in hot water.

The blank moulds a more permanent record when it is allowed to stand about 10 day after coating, the dope during that time settles and probably presses out some of the gasses from the interior

Inspected some Records made during the months of Oct & Nov. '09 of Naphtalene 1 Part Shellac 1½ Part & Resin 1½ Part, Temp. 240° F. which Dope was then considered good. the Records do not now prove to have retained permanency.

6-4-10

Rosin 1/8 oz
Zinc Carbonate 1/64 "
Effervesc.

6-6-10

Benzoic Acid 1/64 oz
Shellac 1/8 "
Chloro-Nap -
W. Flour - N.G.

6-9-10

Benzoic Acid (from Toluol)
with Magnesium Carbonate combine
to produce a glassy mass. (Rosin-like)

6-9-10.

Benzoic Acid 1/4 oz
Magnesium Carbonate 1/64 oz
Chloro-Nap- 3/8 oz
Shel - 3/8 "
Palmatic about 1/2 "

Balkonite (intermediate product)
with Chloro-Nap does not Combine.

6-10-10

Colophene oil 1/2 oz
Shellac 1/4 "
There is a combination after boiling, but
decomposition after 10 m., the mass is very tough.

6-11-10

Balata gum - previously dissolved in
Benzole and the latter allowed to
evaporate, Melt and add some
Sulphur, there is a combination
the result is a soft mass.

6-13-10

Distillers Rosin 1/8
Colophene oil 1/64
Shellac 1/8
Makes Hard, but brittle mass.

Stearic acid with 1/4 oz
Mag. Carbonate 1/64
No Combination

Colophene oil 1/64 oz
Chloro-Nap- 1/8 "
Benzoic Acid 1/32 "
Shellac 1/2 oz
Two soft

6-12-10

Distilled Rosin 1/4
Chlor-Nap 1/16
Benzoic acid 1/4
Shellac 1/4
Melts at low temp. Mass is too soft
Double the quantity of shellac does not
reduce the plasticity of the mass enough.

6-14-10

Stearic Acid (Commercial) 1 oz #6/14
Benzoate of Soda 7/16
Melt, does not appear to combine
but the result is a compound that
looks permanent and compact.
Probably would make good Master
Wax. Try Again with more B. So.

6-15-10

Stearic Acid 1 oz #2
Zinc Oxide 3/32
Mag. Carbon. 1/16

Stearic Acid 1 oz #3
Zinc Oxides 1/16
Mags " 1/16
Stearic Acid 1 oz #8/15
Benzoate Soda 5/32

6-15-10

Stearic Acid 1 oz #8/14
Zinc Oxide 3/64

#6-8/14-10 1/8 oz
Shel - " 3/16 - 1/16
Temp 240° F. Liquid enough but
Pasty.

Try Again the Combination of
Stearic acid in Benzoate of Soda.

Stearic Acid 1/4
Chlor-Nap- 1/4 #6-6/15-10
Benzoate Soda 1/4

#6-6/14-10 - 1/8 oz #7/15
Shellac - 3/16 - 1/16
Looks fair. Temp 240° F. Try Again

Stearic Acid 1 oz #8/15
Benzoate Soda 5/32
Melt over slow fire in about 2 hrs.
The So. is all taken up

#6-10-10

Chloro-Nap- 1/2
Phosphate Lin 1/32 #9/15

#6- 6/14 - 10 — 1/32
#6- 6/14 - 10 — 1/32 #6- 11/15 - 10
Chloro-Nap- 4/32
Shel- 12/32
Looks like Combination that is fairly hard. but granular. Hard-Nap-like.

6-16-10

#6- 8/14 - 10 — 1/8 oz #6- 14/15 - 10
Shellac 1/4 "
Looks Good, Liquid Enough Combination. but Granular. Worth trying Again

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#6- 8/15 - 10 — 1/8 oz #6- 15/15 - 10
Shellac 3/8"
Combines. but produces a mass that is too gummy.
Worth trying again

6-16-10

#6- 14/16 - 10 - 1/8
added shellac. 3/8
Bubbles due to thickness of mass.

Chloro-Nap 1/2 oz
Sodium Phosphate 1/64 #6- 4/16 - 10
Action and a precipitate.

4/16 — 1/8 oz
Shel- 3/16 # 4/16
Looks Good
try again with more shellac

4/16 — 1/8 # 6/16
8/15 — 1/16
Shel- 3/16
Combines to makes a mass that crystalizes. but result is too gummy
worth trying again

4/16 1/8 # 8/16
14/16 — 1/16
Shellac 1/4
Good compact mass that crystalizes. but is not tough enough Try Again. More shel.

6-16-10

Steric acid – 1/4
Zinc Oxide 1/32
Strontium Carb. 1/32 N. G.
Dont Combine

Steric Acid 1/2 # 9/16
Sodium Bromide 1/32

Chloro-Nap- 1/4 # 10/16
Sodium Bromide 1/64

Chloro-Nap- 1/4 #
Zinc Borate 1/64 N.G.
Dont Combine

Chloro-Nap 1/4 # 11/16
Resinated alumina 1/64
Action

Chloro-Nap- 2 oz
Resinated Alumina 1/4 # 12/16
Combines

1/16 1/8 # 13/16
15/16 1/16
Shel- 1/4
Looks Good try again

6-16-10

8 – 1/8 oz Emin proteim
Shel – 1/4 " # 14/16
Looks Good. Liquid enough
not much Bubbles
try again

6-17-10

Magnesium Sterate 1/2 # 1/17
Steric Acid 1/8

Alpha Napthol 1/8 oz
Shellac 1/8 " Too soft
add Chloro-Nap. 1/4 " does not harden
it enough. try again

Chloro-Nap — Magnesium Stearate
& Zinc Stearate
try again # 4/17

Chloro-Nap & Manganese Borate
5/17

6-18-10

Alba Napthol 1/8
Shel- 3/16
Abietic Acid 1/16

6-18-10

Chloro-Nap- + Manganese sterate #1/8 N.J.

Monochlornaphtalene + alpha Naphthol N.J.

Naphthol + Formaldehyde. N.J.

1/8 — 1/8 oz
Shel- 1/8 oz Looks fair. Try Again with more Shell.

6-20-10

Chloro-Nap- 1/2 oz # 4/20
Alpha Naphthol 3/8

Alpha Naphthol 1/2 oz # 3/20
Formaldehyde 1/2 " boil for 5 hrs., produced a clear Brittle Mass.

Alba-Naphthol 1/8 oz # 2/20
Abietic Acid 5/16 "
Arcanilide 1/16 " boil for 4 hrs
Glassy Brittle Mass

6-20-10

2/20 1 Part
Shellac up to 5 parts did not reduce the Brittleness.
Chloro-Nap in Small quantity makes it Tougher.
Try Again

6-21-10

Boil Shel- 1/2 oz in Water 6 hrs. # 1/20
Add 5/16 oz. of # 1/18 & let water Evaporate produces tough mass.
The Shellac and mixtures may boil in water for a very long time without Coagulating.
There is difficulty in getting rid of all the water at the end. Causing Bubbles.

1/8 — 6/16 oz # 2/21
Rosin 3/16 oz. Mass too granular
Shel. 10/16 oz
Hard Mass but difficult to rid the Bubbles.

More shellac will make it Bubble more.

6-22-10

Chloro-Nap- 3/16 oz #1/22
Sterate Lead 1/16
Shel- 11/16
More Liquid than All Others.
Try Again

Chloro-Nap- 3/16 #2/22
Antimony Sterate 1/16
Shel- 1/4
Looks Good try again

Chloro-Nap- 3/16 #3/22
Copper Sterate 1/16
Shel- 1/4 Too-Granular
looks good Try Again

Chloro-Nap- 1/4 #4/22
Copper Sterate 1/32
Nickel " 1/64 Bubbles
Zinc " 1/64
Makes Good mass- but becomes
too brittle after a week.

Stearate Antimony 4/64 #5/22
" Lead 4/64
" Copper 2/64

6-22-10

Chloro-Nap- 6 oz
Sterate-lead 2 "
Shel- 8 oz
made blanks. Too-soft

6-23-10

Monochloronaphthalene
Alba Napthol #1/23
Hydrochloric Acid

6-24-10

Chloro-Nap- 4 oz
Rosin 1/2 #1/24
Acramide 1/4
Sterate-Lead 1/16
Shellac 6 1/2

Chloro-Nap. 1/32
Alba Napthol 1/64 #3/24
Sterate Lead 1/4 of 64 Remains Gummy
Acramide 1/2 of 64
Shel- 1/32

Monochlor Napth. 1/8 oz #4/24
Shel- 1/2 "
Tetra Chloro Napth. 1/4
Looks Good Remains Gummy
Try again

6-24-10

Chloro-Nap- 7/32
Mono-chlor Naphth. 1/64 #5/24
Accaroid 1/64
Shel — 6/32 Remains Gummy

Tetra-Chloro-Naphth. 1/4 #6/24
Mono-Chlor-Naphth 1/8 Too soft
Shel - 3/8
Try again with less Monochlor

Chloro-Naphtha 8 oz
Rosin 3/4 " #7/24
Accaroid 1/2 oz
Sterate Lead 1/8 "
Shellac 3 oz
Made Blanket. Dope was not liquid enough, made air holes

6-25-10

Alpha Naphthol 1/2 #1/20
Formaldehyde 1/2
Fusel Oil 1/4
Heated on steam table over night Next day melted over flame, until condensed, result. Hard brittle mass.

6-27-10

Chloro-Naphtha 1/2 #1/27
Abietic Acid 7/16
Makes Hard brittle compound, but not tough enough.

Chloro-Nap 1/4
Mono-Chlor Naphtha 1/16 #3/27
Shel- 3/8 Brittle Mass

Chloro-Nap- 1/4
Mono-Chlor Naphtha 1/16 #4/27
Accaroid 1/64
Shel- 1/2
Makes fair flexible Mass.
Try Again

Tetra Chloro-Naphtha 3/8 #5/27
Mono-Chlor " 1/16
Accaroid 1/64
Shel- 1/2
Good flexible Mass. little soft

#5/27 — 1/8 oz
Shellac — 5/16 Bubbles, Too much Shellac —
Try again

6-27-10

Tried the New Semi-automatic Coating Machine made according to sketches drawn since June which consist of a melting box having outlet opening near the bottom to feed the Compound upon the blank in a manner that the compound is applied in thin layers similar to winding a Roll of paper. When the blank tube is in position to take the Compound it is made to revolve adjacent to the outlet of the Melting box, which recedes from the blank gradually to a limit which is the proper Diameter of the blank. The paper tubes are carried upon removable mandrils having bibs through them, these revolve upon a fixed shaft to a face plate. Each shaft is provided with a clutch arrangement so that when the mandril is inserted the clutch take hold of the mandril to revolve them. The face plate is mounted upon the end of a revolving shaft also, in order that it may swing to and from the outlet of the Melting box.

6-28-10

Chloro-Nap —	8 oz	#1
Rosin	1 oz "	28
Acrawlicide	1/2 "	Good Dope
Shellac —	1 3 oz	

Chloro-Nap-	8 oz	2
Mono-Chloro Nap	1/16 "	28
Acrawlicide	1/16 "	
Shell-	1 2 oz	

Chloro-Nap-	8/32	#16-30-10
Rosin	1/32	30
Acrawlicide	1/64	
Shel	13/32	

Boiled in Water, added 3 drops Caustic Potash. The mass combines after evaporation of water to a pretty good Compound but still the grains are there

12/16 — 1/8 oz

Shellac 1/8 "

Too Plastic. Could stand more shellac.

6-30-10

#1/18 — 1/8 oz — #3/30

Shel- 3/16

Makes Nice Hard mass. but bubbles add 1/2 of 64 alba naphtol, that make a better solvent and produces a tougher mass, but could not stop the bubbles.

#2/18 — 1/8 oz — #4/30

Shel- 3/16

Good Hard Compound

Try Again to make record by Solibo Record process.

#2/18 — 1/4

Alba Naptha 1/2 of 64

Shel- 1/8"

Boiled for 3/4 hr. & Condensed

#2/18 — 1/8 oz

shel- 3/32 4

Prolonged Heating will also Condense

[130]

Started experiment upon solid moulding of record with Hard Compound

Chloro-Nap - 6/8
Rosin 3/32
Aganalid 3/64
Shel 9/8

#7-1/3

Make good mixture, Oxidalizes quick to handle mass. Tough enough and when liquid enough has very few bubbles. Will not feed itself from Hot matrix. Will feed itself from cold matrix, but the cold matrix chills the mixture so quick that it will not cover the indentations.

Chloro-Nap - 1 oz
Aganalid 1/8"
Shellac 1/2 oz

#7-1/4

Mix is good. at 250°F. it evolves gas, but clears in 5 minutes. Filled a record matrix —

copper shell upon a polished steel Mandrel Poured the mixture, and cooled into cold water solution 40°. after standing there 20 minutes the record could not be extracted. To prove the quality of record surface I opened the matrix with saw, pulled out some pieces, found that the compound did adhere to the matrix surface so much that this method is impossible with this particular mixture.

Entd P.M. JUL 1 1910

Dope # 7/10.

Chloro-Naph- 2 oz
Acetanilid 3/16 "
Shel- 3 "

Made solid blank with taper bore and mould record before the blank was cooled off; then chilled into ice water; in about ½ minute the record contracted enough to drop out of the matrix. The record was imperfect due to the blank surface being imperfect. To prevent the blank adhearing to the mould for making blank it must be made warm enough to melt ceresine and wipe off the excess - the Dope will not stick to metal as treated.

Repeated same method except that I made the Blank mould Hotter and it did stick to; that is due to the ceresine being washed away by the flow of the Dope

Solid Blank Weight, 3⅞ gr.

Entd A.M. JUL 5 1910

Dope # 7/10.

Made Blanks upon Seeley's Spiral tube (the inner-tube) with Dope 7/16" thick, by the revolving method. there was no more bubbles upon such tube. then upon the V.E. #616 paper. the increase of thickness of Dope upon the paper tube was an improvement in the way that the paper does not absorb its changes through the dope as it does with blank Coated with .012" to .015" thick. the blank coated .116" thick will roll to produce a more even and smooth blank than with thinner coatings. But after pressing the Record it cannot be extracted from the matrix. the inner tube paper is so soft that it has no elastic quality to draw back after pressed outward and the 1/16" thick Dope has not enough contraction force to overcome the strength of the paper tube.

Entd A.M. JUN 6 1910

Made Records with Dope # 7/10. by the dipping process the mould is simply the regular Matrix set into a tin Can about 1/4" larger than the O.D. of the matrix. it sits upon a base fixed to the bottom of the Can. which is open to let the dope enter through the bottom. #1 Dipped Hot matrix about 200°F. into Dope 210°F. 3 min. then into cold Sea water. Records contracts out. Record were not perfect on surface. some spots of soft matter showing up.

#2 Dipped warm matrix about 170°F. Dope 250°F. 15 min. then in Cold Sea water did not let go the matrix.

#3 Dipped Hot matrix 4 min. & then in Sea Water just enough to chill dope trimed off & put under 1800 lbs. pressure. then in Sea water. 5 min. it did contract out. Record contained some surface imperfections

Entd A.M. JUN 7 1910

Dope # 7/5 10.
Temp. 280°F. At boils at this temp. reduce temp. stir until bubbles are eliminated. Dip Hot matrix in and out about 8 times, then into Ice water. Contracted out. The record contained surface imperfections.

Rec'd P.M. JUL 8 1910

#2 Ex. # 7/5 10 Dope
Temp. 250°F.
Dope was mix with about 20/0 of some old.
Dipped warm matrix 5 sec, then in Ice water to chill enough to trim off. then put under pressure 1800 lbs. 5 sec. & then in Ice water 5 sec. Comes out fine.
Surface imperfections due to mixture.

#3 Ex. 7/5 10. Dope added more of old. Raised temp to 280° reduce temp. 270° dip. 5 sec. Chill to trim & press 1800 lbs. 5 sec. then in Ice water, would not come out before 1 hour, that is due to the addition of old dope which was partially contaminated, which retards crystalization

#4 Ex. Dop. 7/5-10 Dope Same as #3 Ex. Contained more bubbles. Dipped warm matrix 5 sec then in Ice water. Came out after 1 hour. Records looks good but surface is not frictionless.

(#7/9 #1)

Dope #7/5'10.

Coated blank upon tubes. 10½ layers V.E. paper treated with Monochlora-naphthalene at 225°F. dipped into for 1 minute and set aside in the open for 2 days.

Diameter 2.139" Blank Plain
2.179" " Coated

Thickness of Coating .031"

The casting worked very well except that the mixture was not Compact, some waxy matter did separate, which caused a rough surface.

Rec'd JUL 9 1910 A.M.

(#7/11'10)

Moulder records with Blank #7#1. 1800 lbs. pressure 1 minute.

Result N.G. the blank was too warm causing the Dope to stick on the matrix.

The Dope #7/5'10. is not permanent after 24 hrs. of Summer heat say 90° to 95° the record becomes flattened and distorted aside to the Dope displacement.

The Dope should be of such consistancy that it will stand 95° heat without being effected.

Rec'd JUN 11 1910 A.M.

#1

Chloro-Nap 1/4
Alpha Naphthol 1/32
Acaniticle 1/64
Shel— 7/16

(Chloro & alpha) Melted & Raised Temp to 300°F
Then added Acaniticle & about ½ the
Quantity Shellac & add Calo. & and
Heat to temp near 300°
Result. The Mass is too Plastic.

#2

The addition of Carbon Tetrachloride to the above produces a more plastic mass

#3

Alpha Naphthol 1/16
Tetrachloride Carbon 1/4
Shel 1/4
Result. does not Crystalize. Too Soft

#4

Chloro-Nap. 1/4
Alpha Naphthol 1/32
Shellac 7/16–1/2 Temp 280°
Does not Bubble Looks Good.

Try Again

#5.

Same as #4 with addition of #76 acaniticle

Alpha Naphthol 1/32
Echanite 3/32
Water Glass

#7

Chloro-Nap- 1/4
Amyl Acetate 1/32
Shell— 7/16
Bubbles

#7A

Same as above with the Addition of Arrow-Root which has been dried over steam table about 48 hrs. this makes a more permanent Mass of Dough. but the machine is too coarse

#9

Chloro-Nap 1/4
Monochlor Naphthalene 1/16
Alpha Naphthol 1/32
Shellac 7/8
Result. Too Plastic. Soft

#10

Chloro-Nap. 1/2
Monochlor Naphthalene 1/32
Alpha Naphthol 1/32
Shellac 3/4 Temp 280°
Too Soft. Plastic.

Made preparations to wind paper tubes with only 10½ layers of paper the glue is Gum Arabic in water added a little fusil oil to prevent drying so quickly and also to preserve the glue in liquid state.

Entd A.M. JUL 13 1910

The solid blanks made on the 8th & 9th inst. were left to stand in the open two warm days Temp. 95 to 98 the blanks collapsed due to heat softening the paper.

Diameter of paper tubes of 10½ layers after 5 days air drying measures 2.128" O.D.

Others fresh from Rolls.

#7/4 10.

Blank tubes of V.E. #616 paper 10½ layers. Arabic Glue with about ½% of fusil Oil to the gal. of Glue solution. These Blank tubes will be Numbered #7/4 10.

Entd A.M. JUL 14 1910

The lot that is treated with Glycerine will be called 7/4 A. 10, this treatment is simply wiping the blank with a cloth permeated with glyc.

7/14-10 Tubes treated by dipping in Glycerine warmed to 150° F. This operation is intended to expell the excess of water and so fair the paper tubes. This Lot will be numbered # 7/15-10A

Dipped into monochlornaphthalene at 300° F. about 10 seconds if the dip is longer the tubes will flatten. this lot will be numbered # 7/15B-10

Dipped into Boiling Carbontrachloride 1 minute. this looks like a good method and cheap. This lot will be numbered 7/15-C-10

Guaiacol 3/16 "
Shel — 7/16 "
N. G. When quantity sufficient to dope liquid enough the mass is too soft.

Beta Napthol 1/16 # 7/15-10
Shella 1/4
looks Good —

Beta Napthol 1/16 # 7/15-10
Shel — 3/16
Too soft

Napthylamine 1/16 - 1/32 # 7/15
Shel 3/16 - 1/16 "
Remains soft probably due to the Alcalinie

Ortotoluosulphamide 1/16 # 4/15
Shel — 3/16
Good Hard mass, but turns out too brittle. Bubbles at joint but clears after.

Rec'd A.M. JUL 16 1910

#7/16 #1

Chloro-Nap- 1/4
Napthol (Beta) (subli) 1/16
Mixes good, remains too soft

Halitorpene 1/16
Shel - 3/32 - 1/16
Bubbles, add little Napthylamine - Remains too soft

#7/16 #1 Subs. 1/8 oz
Shel - 3/16 oz

#7/16 #6

Hard Chloro-Nap - 1/4
Napthol (Beta) (subli) 1/8
Shel - 5/16
Resinated Alumina 1/16

Nitranilene 1/32
Shel - 3/32
Beta Napthol (subli) 1/64

Nitronapthalene 1/16
Shellac 3/32

Rec'd A.M. JUL 18 1910

Accanilide 1 Part
Shellac 3/4 "
Makes Hard Mass but not tough.

Same as above with addition of shellac prevents it from crystalizing

#7/8 -10 Blanks

Chloro-Napth 8 oz
Accanilide 4 oz
Rosin 1 oz
Shel - 13 oz

Made Blanks all of which were coated without Bubbles or air holes but the surface was not smooth, the Dope upon cooling contracts irregularly. The Dope remains liquid at sufficient time to be practical. Does not Bubble when temperature remains at 250° or Lower Try again

Records #7/8-10

Moistened 6 Records of the above blanks, All of them pressed good & Extracted easily. Some surface imperfections with all of them

Entd A.M. JUL 19 1910

Moulded reverse moon Records of the #7810 Blanks Heat the blanks over steam Lubricate with mixture of above on the surface then Roll into Polishing Rolls then heat again to make plastic & Mould Record This is numbered #7810 #1

		# 7810
Para Chloro-Naphthal	8 oz	
Accaroid	½ oz	
Rosin	1 oz	
Shellac	14 oz	

Melt Chloro-Nap. & Rosin up to 270° F. add the Accaroid stir well and add about ½ the quantity of Shellac stir until dissolved add the balance of shellac little at a time stirring well Temp. must not rise over 270° Filter through 160 mesh screen in Vacuum

Coated 21 Blanks of 10½ layers # V.E. 616 paper. Discs were left exposed to air for 24 hrs. then placed in oven heated 220° F. for 1 hr. then dipped into mixture of Carbon tetrachloride 8 parts & Monochlornaphthalene 2 parts at boiling temperature 180° for ½ minutes, this has for effect to expel moisture and free the paper from oil spots.

The coating is produced on special device which spreads of layer the compound in thin layers similar to moulding papers. Cold air blast is provided to chill each layers, this method provides a more compact coating than when coated full thickness at fixed distance, as soon as the last layer is applied the blank is rolled between polishing rollers moderately hot about 170° F. the blank is produced to measure at

at the title End 2.168"
at the center 2.174
at the other end 2.173

Rec'd JUL 19 1910

The thickness of paper tube is .029" the thickness of coating material is .030"

Applying great pressure upon the coated blank to polish will loosen the coating from the paper tube.
Rolling it a long time has the same effect?
Rolling it when the coating material is cold will crack the coating.

Blanks that are imperfect on the surface may be reheated to render plastic and repolished between the Rolls.

There is 6 3/8 # of coating material to 10 tubes.
Approximately 4 lbs to 100 tubes at 20 Cents per lb. makes 8 ¢ per tube

Records # 7/10,

Moulding # 7/79 '10. Blanks.
The matrix must be made warm & not Hot.

Rec'd JUL 20 1910

lay about 150°F. The Blank about the same temperature.
500 or 600 lbs pressure is first applied for about 1 minute and then increased to 1200 lbs the matrix should be allowed to cool under pressure, if taken out when still warm the record surface assumes a rough surface after a time.
This lot of Records will be numbered # 7/10

Out of 21 Blanks all ground to eye inspection 8 perfect Records resulted.
One — with 4 air spots
Three — " Pin holes
One — " 1 air spot + 1 Blister
Seven " Blisters
The Blistering seems to be due to a gas pressure expanding from the paper or they are spots where cementation was not effected.

Blanks # 7/21/10

Ethel

Ceresin Wax 8 oz
Rain 1 oz
Melt & Raise Temp to 270° F.
Add Acranilied 1/2 oz & stir
add Shellac 1/4 oz Slitely Little
and stir Rapidly let temp
Raise to 290° F. & Filter
through 160 Mesh wire cloth
The Filter apparatus is specially
made, which consist of two
Vessels between which is fixed
the screen, the compound
is melted into the first vessel
the screen is placed upon
the rim & the second vessel
is placed upsidedown upon
the rim of the first vessel.
the second vessel is provided
with a pipe from the side
near the top, this is connected
to a Vacuum chamber. the
two Vessels are clamped together
& turned bodily over. the Vacuum
draws the Compound right through
the screen almost instantly.

The filtered compound was next placed into the melting Vessel of the Coating device, which is provided with a stirrer made like a propeller operating Vertically, the blades almost touching the bottom.
Coated 12 Blanks 4 of the tubes were blistered, that is, the paper was not properly cemented at various spots, these were marked on the inner side of the tube, after the tubes were coated the blistered spots did all show up, thus demonstrating that the paper tube must be made compact, Every layer must be absolutely cemented.
Aside from these blisters, all the tubes were properly coated to mould good Records.
The Method of Coating was the winding of the Compound in layers same as winding paper.

JUL 21 1910

ENTD JUL 22 1910 A.M

#7/21'10

Moulded Records of Blanks #7/21'10. Six of them all good.

The Method Employed is as follows. the matrix is made warm Temp. 115°F. the Blank about the same or little lower. about 105°F. placed the matrix provided with the blank under 6000 lbs pressure for 1 minute Increased pressure to 12000 for another minute then turned on Cold air onto the matrix to cool same under pressure for 3 minutes. the Records comes out chilled & clean. under no difficulty whatsoever. These Records are Numbered #7/21'10

Have noticed that the blanks after 12 hours standing had lost their gloss the extreme surface had become matt. similar to ground glass. the pressing of the Record brings on the gloss again

ENTD JUL 23 1910 A.M

#7/23'10.

Made 60 paper Tubes of 10½ layers V.E 6/6 paper with Arabic glue having a trace of Fusiloil to preserve it and to retard hardening. made these tubes as good and with as much edge as possible. the winding mandril in this trial running 144 Revolutions per minute giving more time for the glue to permeate the paper.

These tubes will be numbered #7/23'10

Inspected some #7/22'10 Records noticed slight change of surface.

Inspected some # 7/20.10. Records the surface has altered from a glossy to a wavy – much like a shrinkage of the Compound Reproducing on the Phono. a Grating sound issues much more prominent than with the day they were made.

Inspected the #7/12 Record. they also have assumed a rough surface same as the # 7/20.10

Treated some # 7/23.10. tubes by boiling in Tetrachlor-Carbon for about 1 minute after drying in oven for 1 hour. These tubes will be numbered # 7/23.10.A

Chloro-Naph 7 oz
Rosin 1/8 oz
Acamilid 1/16 oz
Shel – 1/2 oz

7/25.10.

Melted Chloro-Naph & Rosin temp 270° F. added Accamilid. Stir. & add shellac little by little. stir well but let temp rise more than 270° Filter through 160 mesh wire cloth in Vacuum Service.
Coated 10 tubes # 7/23 10 A. then added some Utah Silonite and coated 5 more tubes. The last one turned out imperfect due to the dope being Condensed there 5 blanks appear to be of better quality than those without the addition of Silonite. The last 5 blanks will be numbered # 7/23 10 B.

Rec'd A.M. JUL 26 1910

Pressing 7/23 10 B Blanks

Matrix is heated to 120° F. so is the Blank. Pressed at 500 to 600 lbs for 1 minute then increase to 1200 lbs for another minute then turn on Cold air from Elec. Fan. in 3 more minutes the matrix is cool enough to take out Record. The Records were very smooth, as smooth as Wax. and of good Reproducing qualities. These will be Numbered # 7/26 10 B

Pressed 6 # 7/23 10 A Blanks all the tubs were perfect so far as Eye inspection, but after the Cooling of them 4 showed blisters, the surface quality was little more harsh than the # 7/26 10 A.

Made 6 Blanks with # 7/25-10 Dope these will be numbered B 7/28 10

Rec'd A.M. JUL 27 1910

Inspected # 7/26 10 B Records the surface shows some change, these were very smooth when the day made, there seems to be two reasons for the changing, one is that some particles of the Compound swell up & the other where the particles contracts. the defects are visible to the Eye.

Inspected # 7/26 10 A lot of 7 Records 4 of them the Blanks did show blisters & lap seams, one the last layer of the paper was not properly cemented in one spot near the tube — end. All of these imperfections reappeared on the surface of the Record after 12 hrs standing.

Entd A.M. JUL 27 1910

Rosin 1/2
Alpha Napthol 1/2
Talk 3/4 oz
Shel 2 oz

Melted Rosin in crating — Machine Melting Pot added — Alpha-Napthol. Added the Talk. Set Auto-Mixer to work about 5 minutes then add shellac in small quantities 1/2 oz. Coated Blank This will be numbered B 2/7 10

Added 1/2 oz more of shellac and Coated another tube, this will be numbered B 2/7 10 A

Moulded # B 2/7 10 A the Result is fair, the Blank was not free from imperfections it contained many air Bubbles, which did show up after the Record was moulded, the surface is little Rough

Entd A.M. JUL 28 1910

Chloro-Nap- 1/8
Rosin or Resin, about 1/64
Partially Dissolves -

Gum Amalgum & Chloro-Nap - does mix to a clear liquid

Spruce Gum & Chloro-Nap mixes well, few bubbles, Clears after cooled

Amine Opal, requires only very little alpha Napthol to clear

Gum Aluminum & Alpha Napthol Equal parts Dissolves to produce sticky Gum, shellac hardens it

Ent'd JUL 28 1910 A.M.

Chloro-Nap 1/4
Alpha Naphthol 3/32
Amalgum 3/4
Shel — 1/2
Boils at 300° F. #28/18
Produces Hard Mass, but little brittle
Fluid enough to Filter.

Chloro-Nap 1/4
Alpha Naphthol 3/32
Bonain Aloes 3/4
Shel — 1/2
Temp 310° F. let boil for little while #28/19
produces Good Hard Mass, but
little brittle — Try Again

Ent'd JUL 29 1910 A.M.

Chloro-Nap. 1/4
Accaroid 3/32
Bonain Aloes 3/4
Shel — 1/2
Raise Temp, to 400° F. and stir all the time, it Bubbles much, let temp #29/1
drop to 300° add 1/4 more accaroid, this turns the mass to thicken much and looks like condensing add 1/8 more Aloes and Raise temp to 320°. it again becomes fluid enough to Filter.
Result, the Mass does not Harden.

Accaroid 3/8
Bonain Aloes 3/4
Shel — 1/2 oz
Temp 330° then lower to 320° when it clears. When cool makes pretty compact mass but not tough enough. and contains considerable air bubbles.

Chloro-Nap 1/4
Accanilid 1/64 #29/4
Bonair Aloes 1/32
Shel- 3/8
Very Liquid
Not enough shell, Wax exudes

Entd A.M. JUL 29 1910

Chloro-Nap 1/4
Accanilid 1/64 #29/6
Alpha Naphthol 1/64
Bonair Aloes 1/32
Shel - 1/16
Very Liquid. the Naphthol seems to produce softer consistence of the Chloro-Nap. with the shel than the accanilid

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Chloro-Nap 1/4
Acanilid 1/32
Bonair Aloes 1/16
Shel 1/2
Boil for about 25 minutes and it condenses

Paul's Resin 1/16 #30/1
Accanilid 1/32
Shel 3/32

Entd A.M. JUL 30 1910

Paul's Resin 1/16
Aloes 1/64
Alpha Naphthol 1/64 Ng.

Chloro-Nap- 1/4
Accanilid 1/64
Paul's Resin 1/32 #30/√
Shel- 3/8
Coagulated

Chloro-Nap- 1/8
Alpha Naphthol 3/32
Bonair Aloes 1/8
Shel 1/2
Bubbles Little - Temp. 270° F. to filter. Resin Mass but plenty of Bubbles.

Solid Compound Blanks

#2-10#1

Made 7 Blanks of #2-10 Compound. this last was made by coating directly upon the metal monobrid and not upon the paper tube, the Experiment is to prove whether the paper tube is the cause of the surface alteration of the Record

These were moulded same as those with paper foundation with exception that 1000 lbs pressure was the maximum, starting with 400 lbs for 1 minutes & then 1000 for 8 or 10 minutes then chill the matrix & Record in Ice water in about 2 to 4 minutes the Record drops out, Some matrices are larger internal Diameter near the Little End, from such matrices the Record will not come out.

Made 4 Blanks upon paper and with #2-10 Dop. to which was added as much Amorphous Graphite as the dope would allow, these will be numbered #2-10 #2 Records pressed same day & will bear the name Anaconda

Formaldehyde 1/2
Bonair Alcohol 1/2
Put in Flask on Steam Table Ent'd AUG 2 1910 A.M.
melt at low temp, it Bubbles much. the resulting mass is hard but too brittle to use of none, added some Chloro-Naphthalene which reduced the brittleness, the mass is now no better quality than when no formaldehyde is added

Chloro-Naph- 1/8
Alpha Napthol 3/32
Bonair Alcos 1/8
Lime Alumina 1/16
Shel- 1/8. Melt and Raise temp to 330°F. then reduce temp to 310° and add 1/4 more Shell. this mass is fair quality but Condenses over steam table in 1 hr.

Chloro-Naph- 3/16 # P-2-10
Alpha Napthol 1/16 1
Lime Alumina 1/16
Shell. 1/8 Melt & Raise temp to 400°F and add 3/8 of Mix of Shell & Reduce temp to 260°, Good Length Mould but full of Bubbles. [165]

Chloro-Nap. 3/16
Gum Alumbia 1/8
Alpha Naphthol 1/16
Shel. 1/8 Melt & Raise temp. to 400°F. add 3/8 mm of Shell. & let temp reduced to 260°F. Result, the mass is similar to # 8-2-10 but more brittle. Contains Bubbles —

Rec'd A.M. AUG 2 1910

8-4-10
1

Chloro-Nap. 1/4
alpha naphthol 1/32
Resorcine 1/32
Shel 7/16 — 1/8 mm

Rec'd A.M. AUG 4 1910

8-4-10
2

Chloro-Nap- 1/4
Resorcinol 1/32
Accamlide 1/32
Shel 7/16
Sandarac 1/8 Melt and kept at 250° for 1 hr. Make Total Mass but Bubbles much & little too brittle

8-4-10
3

Accamlid 1/16
Resorcin 1/16
Shel 1/8-1/8-1/8-1/8
Boiled for about 3 minutes

8-4-10
4

Acamilide 3/16
Acid Silicic 1/16
Shel — 1/8 - 3/16 - 1/16 - 1/16 - 1/16
Chloro-Nap- 1/8

Rec'd A.M.
AUG 4 1910

#8-4-10
J

Accumbell 1/32
Resorcine 1/16-1/16
Shel-lac 1/2
Elimi 1/32

Hard tough Mass. Bubbles

Chloro-Naph- 1/4 #8-4-10
Acamlid 1/16 b
Silicate Aluminum 1/8 . Melt at 300°F.
Shellac 1/16
This Mass does not Bubble and is flexical enough to filter After Cooled the Surface was very little mat and only few pin-holes. But little too soft try Again with less amidole

Mr Edison gave me some pieces of composition which he said came from Elsworth the pieces were Rolled about 3/32" thick 2 3/4 wide and curled to form cylenders but not welded together. with instructions to mould the samples in Cylendrical Matrix. Heated Matrix 600° — Steam-table temp 240° and heated composition in oven over steam table about 2 25°. Put under 1000 lbs pressure for about 10 minute and cooled with Electric Fan. The Record would not extract. even with cold air application. But into Ice-water for about 10 minutes and was able to force it out the Record was not compact in spots and was good in part.

#8-5-10
1

Alpha Napthol 1/16
Stove Clay enough to
make thick paste
& add shellac

Rec'd A.M. AUG 5 1910

#8-5-10
2

Chloro-Naps 1/8
Amlid 1/64
Alpha Napthol 1/4
Stove Clay 3/16
Shel - 1/8
After 1 hr. setting was little
soft, but tough

Chloro Naps 1/8
Elemi 1/8 Gummy Mass

Chloro-Naps 1/8
Elemi 3/16 More gummy

Chloro-Naps- 1/16
Elemi 3/16 Gummy

Elemi & Alpha Napthol
Produces a sticky mass

Rec'd A.M. AUG 5 1910

Elemi 1/32
Locus 1/32
Amlid 1/64
Shel 1/16

Elemi 1/16
Locus 1/32
Amlid 1/32
Melt and Raise temp to 320°F
and add shell 1/16 & keep down
Fuse at 240° for 1 hr. would not
fuse itself from Bubbles
add 2nd Aluminum 1/32
that made it Bubble more N.G.

Elemi

Elemi 1/8
Shellac
Asbestos 1/8 3/16 - 80 mesh
Temp 350°

End'd A.M.
AUG 6 1910

Elemi 1/8
Shellac 1/8 3/16 1/16 Coarse
Asbestos
Temp - 350°

Shellac 1/8 1/32
Elemi 3/32 - 80 Mesh
Asbestos
Very Hard + Tough

~~Stock~~ ~~Soap~~

Elemi 1 1/2
Shellac 5
Asbestos 4
Attack Solvents 1

Melt Elemi add Solvents and stir well
add asbestos stir well
Condensed. Probably due to the
Solvents try again without

Elemi 1/16
Candelilla 1/64
Shirley Mass

End'd A.M.
AUG 6 1910

Elemi 1/16
Sandarac 1/16
Toughens the Elemi
add about 1/32 Chloro Nap -
Produced clearer Mass but no
tenacity, add asbestos to thicken
made Tough Hard mass
Slightly sticky.

Marmorbleum - 1/16
Shellac 1/16 Jointly Hard

Marmorbleum 1/16
Naphthyamine 1/16
Shellac 3/16 add 1/64 Salt on
Remains liquid 2 hrs. Don't seem to improve
and produces a pretty tough
mass but all bubbles are
not eliminated Very Hard
Try again

Acamulid 1/4 #8-8-10
Chloro-Nap-1/8 3
Shel - 3/8-1/8-1/8-1/8
Temp: 240°
Soft chloro core
Colored a sample unlt #26 Andina

Ent'd P.M. AUG 8 1910

Chloro-1/8 #8-8-10
Acamulid 1/4-1/32 4
Shel - 1/8-1/32-1/32
Asbestos 3/32-1/32

Alpha Naphthol 1/64
Acamulid 1/8
Shell - 3/64
Asbestos 1/16 N. G.

Acamulid 1/8 #8-8-10
Shel - 3/32 5
Asbestos about 1/16

Acamulid 1/8 #8-8-10
Shell 1/8 6
Asbestos fine 3/16
Looks Very Good
Slow Hardning

Acamulid 1/8
Shel - 1/8
Asbestos 1/8 #8-8-10
Slow Hardning 7

Acamulid 1/8
Shel - 1/8
Asbestos 3/16
Flock (Black) 3/64

Ent'd P.M. AUG 9 1910

#8-9-10
1

Acamulid 1/8-1/32-1/32-1/32
Novachlore 1/32
Shel 3/16 Soft

8-9-10
2

Acamulid 1/8
Elmin 1/32
Shel 1/16
Gray Flock 1/16

Acamulid 1/8 8-9-10
Chloro-Nap- 1/16 3
Shel 3/16 Hard. Tough. But
B. Flock 1/16 wafey on surface
asbestos 1/16 enough to flatten record

Elemi 1/16 #8-9-10
4
Alpha Napthol 1/32
Shell - 3/16
Flock - 1/32
Asbesto 1/32

Rosin 1/8 8-9-10
Asbestos 3/16 5

7½# Copal 1/8
Asbestos 1/16

Sulphur 1/8
7½# Copal 1/8

7½# Copal 1/8
~~Shell #16~~
Alpha Napthol 1/64 - 1/64 Raise temp to 475° then lower gradually

Acamilick 1/8
Asbestos 1/16
Shel - 7/8 Too thick

Acamilid 1/8 #8-9-10
Asbestos 3/64 6
Shel 3/32
Not very fluid

Acamilid Heated at 340°F. temp for 4 hr. it assumes a dark brown color almost black & forms a brittle cristaline mass - #8-11-10
0

Acamilid 1/8 #8-11-10
Asbestos 1/16
Shell 3/32
1

Acamilid 1/8 #8-11-10
Asbestos 1/64
Shell - 3/32
2

Acamilid 1/8 #8-11-10
Asbestos 1/64
Shell - 1/64
3

#8-11-10 — 1/8 - 1/64
0

#8-11-10
4

Extra PM
AUG 11 1910

Asbestos 3/64
Shell - 7/64
Good tough mass; little trouble to work.

Mr Edison Made Compound of Resin (Special) with five asbestos Powders — Coated 4 Blanks Moulded 2 Records, they are Numbered # 8-11-10 / 5 The Yellow colored record did not reproduce Smooth enough to be commercial the darker shade is due to heating the blank over steam table oven for 1½hr. it does not reproduce quite as smooth.

Talleys Dope # 321
Coated several blanks when temp was 240° to 260° but the compound was not homogenous, it did seperate immediatly upon cooling, but when the temp was raised to 300° F and Kept

—there for ½ hr. The mixture became more compact and Coated 2 blanks, and moulded the records, the Pink colored was the smoothest enough to be Commercial, the darker shade was due to heating longer in oven prior to moulding record. these are Numbered # 8-11-10 / 6

the next morning the above dope was reheated all and about ½ oz of Common Yellow soap was added the mixture immediately commenced to bubble, after about ¾ hr. with stirring all the time the mixture did clear enough to coat 4 blanks and moulded 3 records, one of them Marked # 8-11-10 / 6A was the smoothest, in fact smoother than the wax records. # 8-11-10 / 6B was not quite as smooth due to the blank surface before moulding Record.

Rec'd AUG 12 1910 P.M.

Sally's Dope # 336
made in melting kettle
no Jettering made up
of Tetra Chlor Naphthalene
Zinc Stearate
Diphenylin
Shellac.

Melted the three first ingredient at 300° F. and added the shellac little by little, the Mixture was very liquid but full of Bubbles. After over boiling the Bubbles were nearly eliminated coated 6 Blanks, the process is slower than most other Mixtures because it does not set as quick will mould the records to-morrow these will be Numbered
8-12-10

Record moulds good and is very Smooth. But soft.

Rec'd AUG 12 1910 P.M.

Dope # 321 made by Mr. Edison. Melted with 300° F temp. after being liquid ten minutes and stirred well Coated first blank. it had a tendency to seperate. after 20 minutes the Mixture was more compact. there was no bubbles. at the end of 40 minutes the Mixture was still Good for Coating, but not sufficient quantity to coat more. Let stand till morning. these will be numbered
8-12-10

Moulded Records, three Blanks that showed a mixed color were not as smooth as Che one that was a solid color But the pressure forces to the surface a waxy matter that accumulates in spots upon the molding which is imprisoned and either or heat pressure will not make good.

Rec'd AUG 13 1910 P.M.

Entd AUG 15 1910 P.M.

Dalley's Dope #345
Tubes that have been shipped off to coat over again.
Coated 10 Blanks, the dope was not filtered, was made by Peters in Chem. Lab. Melted in coating machine at 270°F. Ingredients enough. The Particles of impurities it contained caused little trouble in getting smooth surface. But the Polishing Rolls worked out most roughness. When Cool. Polished the Blanks on Rhono-Lucy-High Speed with sand paper and burnished with Papers & moulded the Records. Will number them # 8-15-10

Made one Record of Dalley's Dope # 321 Made by Peters, the dope did not seem to melt well in coating machine. Had some trouble in moulding one blank that was good enough to mould Record this Record will be numbered # 8-15-10 1A

[183]

Entd AUG 16 1910 P.M.

Dalley's Dope #359
Mixed in Chem. Lab. turned into Coating machine. Dried to Constant heat at 240°F was run to 260°F. Became Liquid enough to coat, made 10 blanks. Was operating Roller Rounded for quality Not very Smooth 2000
8-16-10

Jan. 4th 1912 - Inspected Record was very Rough

Dalley's Dope 8-16-10
10 gr. Pb. Cl
5 gr Resin (Edmonds)
1 gr Acamboide

Melted at 300°F was Cooled to Thick Coated one Tube & moulded Record. Found the dope to have the quality of melting very quickly, Quality Characteristic to Polish Clothes Rolls & Rolls thing it Records say 200 The Concentrations quality of this dope as shown is very good The blank was quite smooth, slight Pitting, Many depressions and not filled in. The finishing by the Record filled all. Was Smooth Enough.

Moulded Dalley's dope # 3.45
Blanks made on the 5th
Rec'd P.M. these will be numbered # 8-15-10
AUG 17 1910 One of these was moulded — 15
— with only 600 lbs pressure will be Numbered # 8-15-10
was Comm. Smooth T. C. But have spots that did not press out.

Moulded Blanks 8-16-10 the Records will be called Number 8-16-10
2-A

5 Chlorate
½ gl. Starch or Rumalo
15 Sphere
Dalley's Dope # 365

Rec'd P.M. Made 15 blanks, were the finest looking blanks up to date temp. 308° F. sets quick enough, the Polishing Rolls must be about 200° Hot and the blank should be taken from the coating machine in quick order, it must not be chilled enough to prevent cementation when the dope is pressed together on the surfaces. these blanks will be called # 8-17-10
AUG 17 1910

Mould one Record, will be # 8-17-10

Moulded Blanks #8-17-10
and will be Numbered

Date PM 8-18-10
AUG 18 1910

Pressure to begin 600 lbs / minute
& then 1200 lbs until cook, the
blanks must be heated only enough
to render slightly plastic, the matrix
only about 150°.

Vally's Dope # 368
Blanks made 1/2 #8-18-10
2

Date PM Dope Works little viscous
AUG 18 1910 and Bubbles. Works better
with cold air blast and very Hot
Rolls for polishing. Hardens quick
enough and is very Tough, has
good cementation qualities.
Pressed Records, the Blanks
requires little higher heating as does
the Matrix. Will be Numbered 8-18-10
2

Edison Dope of Formaldehyde and Phenol
& Shellac 310 g. Works well. Liquid
enough & Polishes well between the
hot Rolls. Contains impurities. The
Blanks will be No # 8-18-10
3.
Moulded one Record
will number # 8-18-10
3-A

Edison Tape # 371 will be
Numbered 8-19-10
Made 12 Blanks 1st works
well at 250°. Jam buddies.
Moulded 3 Records with
Drear the same number. one
was smooth as wax. the other two
were Rough blankets and they blistered
after about 10 hrs.

Moulded Blanks # 8-19-10
/
will be No # 8-20-10
/

Wound 115" turns of V. E 616 paper
10½ layers. left to dry in the oven.
These will be numbered # 8-20-10
/

Rec'd
AUG 22 1910

See next Book

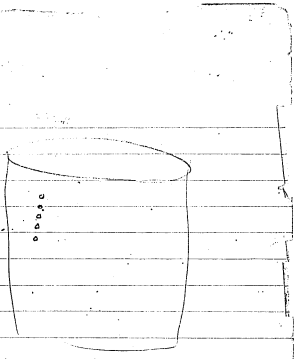
Stearic Acid 10 Parts
Caustic Soda Solution
used to Bleach Paper Pulp 1/4"
made a Sample of wax that
Had the greatest contraction of
any Sample I have yet
Look into again

[ITEM FOUND IN BOOK]

1 to 2 of shellac
This flows, if you
want it thicker
put more Lac in —

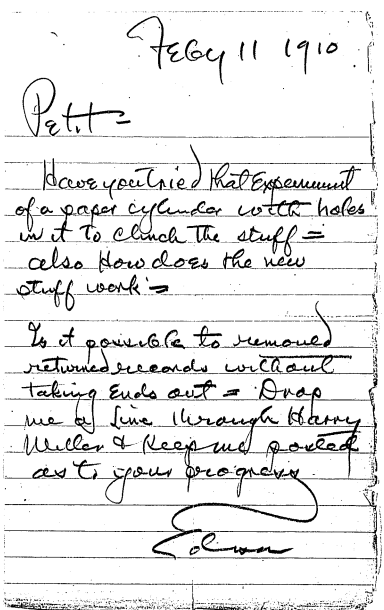
Lampblack can go
in if ground with
the yellow wax to
get Lumps out.

Edison Jann 31st 1910



Jan. 31st 1910
Edison Sketch of paper
tube perforated throughout.
The object is to prevent the
cracking of the coating material
when subjected to extreem low
temperature. It is thought that the
Coating material will permeate through the
perforations and fasten itself thereto.

[ITEM FOUND IN BOOK]



FEBY 11 1910

Pettit=

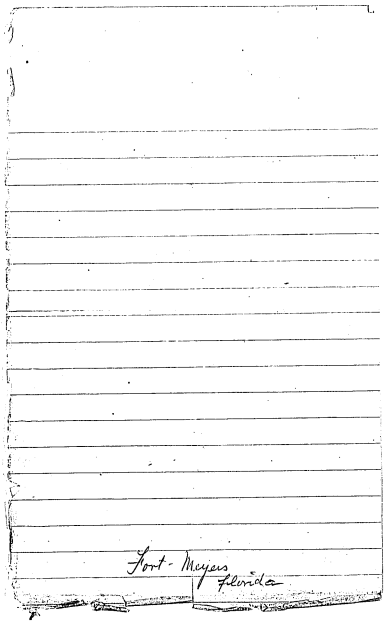
Have you tried that Experiment of a paper cylinder with holes in it to clinch the stuff= also How does the new stuff work=

Is it possible to remove returned records without taking Ends out = Drop me a line through Harry Miller & Keep me posted as to your progress

Edison

[ITEM FOUND IN BOOK]

[ON BACK OF PRECEDING PAGE]



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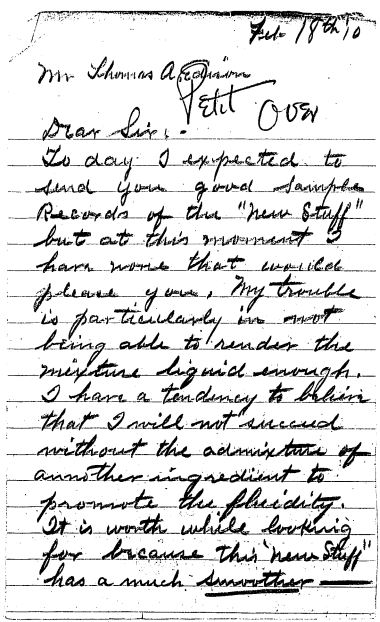


Feb 19th 10

Mr Thomas A Edison

Petit Ovex

Dear Sir, -

To day I expected to send you several samples Records of the "new Stuff" but at this moment I have more that would please you, My trouble is particularly in not being able to render the mixture liquid enough. I have a tendency to believe that I will not succeed without the admixture of another ingredient to promote the fluidity. It is worth while working for because this "new Stuff" has a much smoother

[ITEM FOUND IN BOOK]

[ON BACK OF PRECEDING PAGE]

Aylesworth uses 2 of shellac to one of the wax & it flows OK for the dipping process, he however makes it a little more fluid by adding to 1 part of the wax — 1/10 th part about of a Chlorosolvent Naphtha — Ask Greeley to give you some of it you can make it plenty fluid Enough — Aylesworth 2 shellac to 1 of wax gives a much harder surface than with Lac & Naphthalene —

The Experiment with the paper shell showed work with thinner stuff — You should heat the paper + mandrel — aylesworth has to to prevent congealing — Edison

[ITEM FOUND IN BOOK]

March 7 1910

Petit

Aylsworth uses 1 of Tetrachloromethane to 2 of Shellac + adds to this a percent of the Chlorinated Solvent Naphtha to make it more fluid — did you try this — There is something that comes to surface in time in many of these Compounds but I have never found that you could detect any secretion from them in the Phonograph =

I suggest two lines of Experiment. One a ~~form~~ which has the minimum of Stuff + this is used up very quickly the stuff runs into it from a Continuous melter

Cylinder to be dipped

Wax form

Between pot + Cylinder

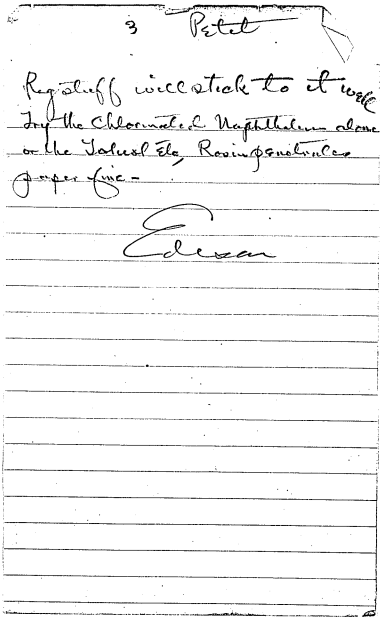
2

Petit

This could be made to hold only 10 or 15 minutes supply + the liquid could not condense in this time previously mixed stuff which had to be formed + melted could be fed into a small dressing pot + made to Continuously supply the dipping pan - by adding stuff to the melting pot =

2nd Suggestion is that the paper Cylinder be previously dipped in some thin low melting point material not Volatile like Resin that would penetrate the paper remove air water + decomposes any impurity of speck of dirt that the heat Causes to decompose + gives off gas - + then dip the paper so prepared in The Regular stuff of Course it should be of such a nature that the

[ITEM FOUND IN BOOK]

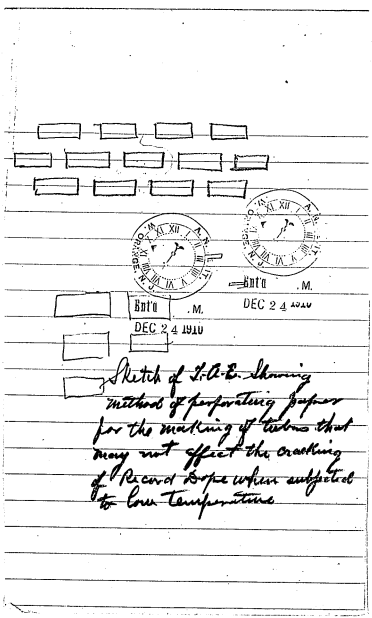


3 Petit

Regaluff will stick to it well
Try the Chloronaphthalene alone
on the Natural Ele, Resin specimens
paper fine -

Edison

[ITEM FOUND IN BOOK]



Patit

How does the new way I gave you work with the vaccine —

When you get some records made from it send me 2 or 3.

Edison

Patit =

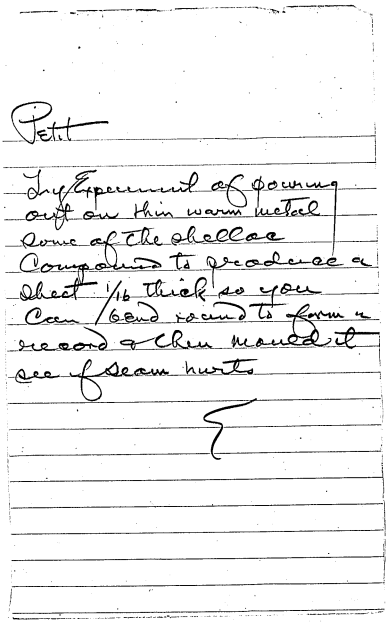
I have told Lancaster to go ahead & make a large lot of the Chromated Tolual —

It's already patented —

The change in tone of the surfaces from (a) Color + even Crystal showing don't seem to affect the reproduction with these Vac compounds

I have a record here made by J. W. Aylsworth which has turned green + literally covered with Crystals under which it is clear [illegible] =

[ITEM FOUND IN BOOK]


Pettit

Try Experiment of pouring out on thin warm metal some of the shellac Compound to produce a sheet 1/16 thick so you can bend round to form a record & then mould it see if seam hurts

[ITEM FOUND IN BOOK]

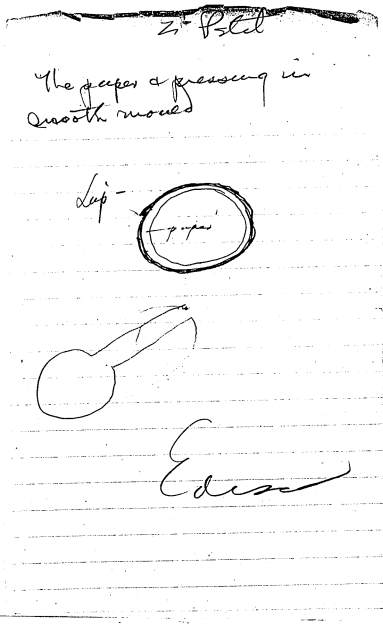
Petit =

Did you ever try the Experiment of dipping them putting in a smooth ~~Steel~~ Mould + pressing hot then reheating + pressing in a record = I think Al Wirth or Aylesworth has a smooth Mould you can borrow —

2nd Idea = flowing the Melted Material out on flat sheet width of record + many feet long. Then delaching while plastic Cutting it in right length + lapping it around

X

[ITEM FOUND IN BOOK]



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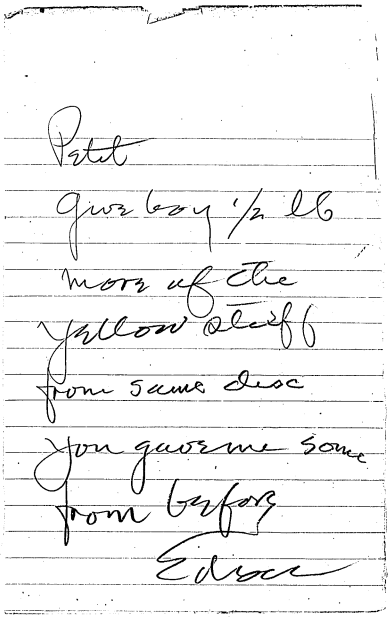
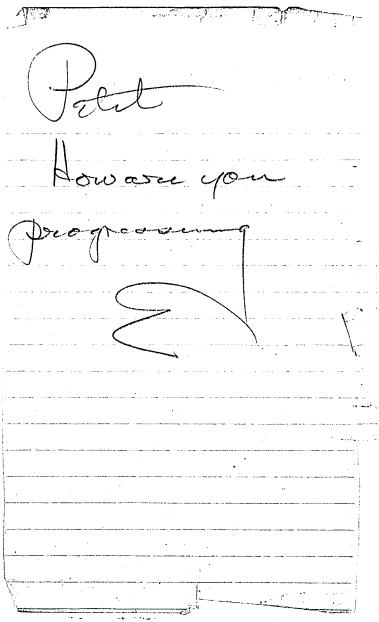
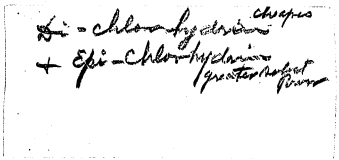


Petet
gave boy 1/2 lb
more of the
yellow stuff
from same disc
You gave me some
from before
Edsac

[ITEM FOUND IN BOOK]



[ITEM FOUND IN BOOK]